M.R.O. 1—77,006—8-6-31.

(1) Number of pages_____

(2) Date of repair_____

(3) Initials of the Referencer_____

MADRAS RECORD OFFICE.

Government of Madras.

Public works **DEPARTMENT.**

G.O. No. 125-126	65	Press / Mis.
Dated	9- 1-	1873.

Not to be folded or roughly handled

Proceedings of the Madras Government, Public Works Department, 9th January 1873.

No. 125. Read the following letter from the Chief Engineer for Irrigation, to the Secretary to Government, Public Works Department, dated Fort St. George, 3rd December 1872, No. 61:—

I HAVE the honour to forward letter No. 220, from the Acting Manager of the Madras Irrigation and Canal Company, enclosing three reports from the Acting Chief Engineer, explanatory of the excess expenditure on the 1st, 2nd, and 8th Sections of the canal.

2. It will be observed that the figures of the Acting Chief Engineer do not exactly coincide with those of the Acting Manager, and these slight differences, it is explained, arise partly from refunds and partly from the Acting Chief Engineer not having brought his figures down to the most recent dates.

3. The excess expenditure on the 1st and 2nd Sections being within the limit of 5 per cent. of the estimates, has been sanctioned by this office under the authority conveyed in G. O., No. 18, dated 5th January 1869, but as that on the 8th Section exceeds this limit, a statement of the net amount requiring sanction is herewith submitted to Government.

	Rs.	A.	P.
Amount expended up to date	8,22,061	12	11
Amount sanctioned by Government up to date	7,80,111	0	0
Net amount requiring sanction	41,950	12	11

From the Acting Manager of the Madras Irrigation and Canal Company, to the Acting Chief Engineer for Irrigation, dated Madras, 11th September 1872, No. 220.

I HAVE the honour to hand you supplementary bills of cost of the 1st, 2nd, and 8th Sections, together with three several reports from the Acting Chief Engineer, explanatory of the excess expenditure over estimate upon those portions of the canal.

2. Unfortunately the Acting Chief Engineer in making up his statements has not brought the figures down to the most recent date, but the differences (arising partly from refunds) are comparatively trifling, and probably you will not consider it necessary, for the sake of these differences, to call for fresh statements and reports, both of which are, as you will see, very elaborate.

In the 1st Section the expenditure to date was Rupees 10,97,409-12-11, instead of Rupees 10,97,516-13-10.

In the 2nd Section Rupees 19,69,906-15-6, instead of Rupees 19,68,700.

In the 8th Section Rupees 8,22,061-12-11, instead of Rupees 8,19,021.

In the 1st Section the per-centage of excess remains unaltered, 2·2.

In the 2nd Section it is ·3 per cent., instead of ·25 (¼).

And in the 8th Section it is 5·4, instead of 4·99.

3. I trust that upon these statements and explanations you will feel yourself justified in passing the excess expenditure in accordance with G. O., No. 18, of 5th January 1869.

From the Acting Chief Engineer, to the Acting Manager of the Madras Irrigation and Canal Company, dated Kurnool, 30th August 1872, No. 506.

Your letter No. 336 of 12th instant.

I have the honour to forward a statement showing expenditure on the 2nd Section Works in comparison with sanction, from which it will be seen that expenditure has

exceeded sanction by	Rs.	5,330
The total sanction being	,,	19,63,370
And actual cost	,,	19,68,700 or about ¼ per cent. above sanction.

In G. O, No. 18 of 5th January, the rule is laid down that expenditure incurred on completed works within the limit of 5 per cent. of the sanctioned estimates may be passed.

The excess above stated is then only one-twentieth part of the limit allowed.

Upon most of the items the differences are so slight as to call for no remark, but I proceed to give the following explanations of the more important differences :—

(1.) The first item of importance is an excess of Rupees 1,744-12-0 on canal walls on 18th mile, which is due chiefly to raising these walls in accordance with paragraph 11 of the Consulting Engineer's letter, printed with G. O., No. 3,195 of 15th October 1867, in which Colonel Mullins says—

"I consider that either the wall should be carried up to 3½ feet above water, or to 1½ feet above the level shown in the cross sections, or that the earthwork should be carried up at least 4 feet above that level."

The former being considered the more suitable arrangement for the work, has been followed.

I will here remark that Mr. Crawford levelled the various walls on the 2nd Section requiring to be thus raised, and that they have been carried up to a level 3½ feet above water, as required.

It was expected that there would be sufficient saving on the miles to cover the small extra cost of doing this, and, therefore, no special estimate of cost was submitted.

(2.) The next item calling for remark is on the 21st mile, where there is an excess of Rupees 1,155-4-7 for earthwork.

About the beginning of 1871 it was found that the right bank of canal had settled very much, and the above excess is due to the making up of that settlement.

(3.) 26th Mile, canal wall. The excess here is due to work at the old A wall at 25 miles 79 chains, which was approved of in G. O., No. 227 of 26th January 1871, but the cost of which was not entered in any sanctioned estimate.

		Rs.	A.	P.
(4.)	26th Mile, puddling excess ... ... This is owing to the omission of money due for work done from the last estimate sanctioned.	660	12	6
(5.)	27 h Mile, canal wall excess ... ... Due to raising walls in accordance with G. O., No. 3,195 of 15th October 1867.	685	8	0
(6.)	29th Mile, earthwork excess ... ... This is owing to the omission from last estimate of money due to Contractor Zicheriah Khan for work done previously (in 1869).	1,700	7	9
(7.)	30th Mile, earthwork excess ... ... Due to the same cause as last item.	1,544	2	5
(8.)	31st Mile, earthwork excess ... ... Due to the same cause as last two items.	150	10	0
(9.)	Lastly, there is an apparent excess of ... ... On an item placed at the end of the statement to cover excess of expenditure on revetment and shingling over the whole 2nd Section.	7,345	13	6

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This is due to an error in arrangement in the last estimate which was sanctioned by G. O., 2,782 of 19th November 1870.

In that estimate it will be found there was an item of Rupees 13,005-15-5 inserted to cover the excess expenditure on revetment and shingling over the whole section. But on examining the estimate it will be found that Rupees 13,005-15-5 did not by any means cover the excess expenditure on revetment for there were items of excess inserted in ten out of the fifteen miles referred to.

When these items are brought out of these miles to the place they should have occupied the large difference now seen is almost entirely accounted for. The remainder of the excess is due to the incompleteness of the last estimate.

From an examination of the measurements of work on the 2nd Section it appears that the actual average cost has been by no means high.

The efficient work may be divided into three heads, namely,—

(1.) Masonry, including arch work cut-stone, centrings, etc.
(2.) Earthwork, including rock cutting and high banks.
(3.) Revetment of dry stone and shingling on the slopes of embankment.

Having checked the actual quantities of earthwork in three miles of the 2nd Section taken at random with the quantities entered as executed in the accounts of work done, I find a difference of only 1·6 or, say, 1½ per cent., due probably to settlement since the work was made.

	Rs.
The actual cost of works on the 2nd Section, excluding charges for contingencies and stores, has been	16,94,876
Charges for contingencies and stores	2,73,824
Total cost of the section...	19,68,700

charges for stores about 9 per cent. and the

The following statement may, I believe, be accepted as showing fairly the amount and value of work done on the 2nd Section :—

		Rs.
138,192 cubic yards masonry in aqueducts, bridges, walls, etc., at Rupees 3-8-0...		4,83,672
3,912,221	do. embankment and rock cutting, at Rupees 0-4-6 ...	11,00,312
205,424	do. revetment at Annas 12	1,54,068
Estimated present value...		17,38,052

As the actual cost of works has been Rupees 16,94,876, the prices given above are a little in excess of the actual cost, and considering the hard nature of the cuttings and great height of many of the walls and embankments, and also the fact that the price for masonry includes the cost of arch work, cut stone, etc., it must be admitted that the rates are moderate.

With the above explanations I trust the account herewith forwarded may be passed.

From the Acting Chief Engineer, to the Acting Manager of the Madras Irrigation and Canal Company, dated Kurnool, 30th August 1872, No. 507.

I HAVE the honour to forward a comparative statement showing difference between sanctioned estimate and actual cost of the 1st Section, Main Canal, from which it will be seen that the total excess of cost over sanction only amounts to 2·2 per cent. or less than half of the variation allowed by G. O., No. 18 of 5th January 1869.

The above excess is also entirely due to the cost of stores and plant. Upon works there is an actual saving on the sanctioned estimate of nearly 1 per cent.

The chief items of excess are as follow :—

(1.) Rupees 1,792-5-7 on the 2nd mile earthwork. This is entirely due to the extremely hard nature of the rock cutting.

(2.) An excess of Rupees 1,406-11-11 on No. 6 Culvert. This is due to alterations made after the breach of 1868, and is more than covered by the balance remaining on the sanction given for repairs required after the floods of 1863, see Item A., near end of the comparative statement.

(3.) 6th Mile earthworks, excess Rupees 593-15-7, due to the settlement of Yederoor Tank Bund.

(4.) 6th Mile revetment, an excess of Rupees 783-2-4 due to the raising of revetment up to top of bank to protect it from the waves formed in high winds on Yederoor Tank.

(5.) 7th Mile earthwork, an excess of Rupees 927-14-5 due to the hard nature of the rock cutting.

(6.) 10th Mile earthwork, an excess of Rupees 780-15-3 due to the settlement of embankment.

(7.) 16th Mile earthwork, an excess of Rupees 707-9-1 due to the hardness of the rock cutting.

(8.) 18th Mile masonry wall in approach to aqueduct, excess Rupees 484-1-3 due to the raising of walls in accordance with G. O., No. 3,195, of 15th October 1867.

With the above explanations which show that the variations from the sanctioned estimate are unusually slight, I trust the accounts for 1st Section, Main Canal, may now be passed.

From the Acting Chief Engineer, to the Acting Manager of the Madras Irrigation and Canal Company, dated Kurnool, 31st August 1872, No. 508.

Your letter No. 336 of 12th instant.

I have the honour to submit a statement showing final cost of the 8th Section, Main Canal, from which it will be seen that sanction has been exceeded by 4·99 per cent. or rather less than the limit allowed in Government Order No. 18 of 5th January 1869 :—

1863 and amounted to	4,37,410
revised estimate for earthwork and masonry (in which, however, the rates for masonry were unaltered) was sanctioned in 1865, giving an increase of	1,21,200
In 1866 a further sum was sanctioned (for earthwork alone) amounting to	1,76,220
In 1870 an extra bridge at Jillala and altered calingulah arrangements were sanctioned at an estimated cost of	43,281
Making the total sanction accorded up to the present time	7,80,111

From this it appears that since 1865 no revised estimate for the locks and other heavy masonry works on the division has been sanctioned, and that in the estimate of 1865 for masonry works the rates fixed in 1863 were adhered to. This is the chief cause of excess, the old estimate having been insufficient for the masonry to be built both in quantity and rate.

3. For example it showed 1,536 cubic yards of masonry in Lock No. 6, but that lock actually contains 2,360 cubic yards, and could not have been safely built with less.

4. Again, the estimate rate for masonry is Rupees 2-8-0 per cubic yard, whereas a fair average rate would have been Rupees 4-8-0.

5. There are many reasons why masonry is more costly on Koondaur Division than, for example, on Hindry Division. Amongst others the following :—

(*a.*) The distance of good quarries and beds of stone from the works. At Donapaud all the stone used had to be carted about 5 miles.

(*b.*) Lime and sand are dearer than at Kurnool.

(*c.*) The fine work required in locks which is naturally more costly than masonry in large retaining walls of simple design.

Having examined the accounts, I find the items of excess may be classified as follows :—

(1.) On Yalloor Sub-division, which was separated for a time from the rest of Koondaur Division, the excess on works alone has been Rupees 10,560, or 5·33 per cent.

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(2.) On Koondaur Division proper the excess on works has been Rupees 8,599, or 2·00 per cent.

(3.) The average excess on works over the whole division, including Yalloor Sub-division, is Rupees 19,150, or 3·05 per cent.

(4.) Contingencies have cost Rupees 1,288 more than sanction, or 3·66 per cent.

(5.) Stores and plant have cost Rupees 18,470 in excess of sanction, or 15·66 per cent.

I should here note that in the accounts the cost of purchasing and transporting the lock gates and valves is included in store charges.

(6.) Including the excess on stores the average excess of cost on the whole division is as before stated 4·99 per cent.

Besides the insufficiency of the original estimate rates there is another cause of increased expenditure.

The estimate sanctioned in 1863 provided for only two bridges and five ferry boats.

Afterwards one of these ferry boats was struck out (in 1865).

In Government Order No. 1,712, of 18th July 1870, an estimate for another bridge was sanctioned at a cost of Rupees 5,700, making the total sum entered in sanctioned estimates for bridges and ferry boats Rupees 20,608, but that only provided for four boats and three bridges, or about one bridge to each ten miles of canal, which was manifestly insufficient for the requirements of the country traversed.

In Government Orders No. 3,586, of 17th November 1868, and 400 of 8th February 1871, better arrangements were agreed upon, and twelve bridges have actually been built on an average of one bridge to each 2½ miles of canal.

The total cost of bridges has been 40,442, and the sanction for bridges and ferry boats was 20,608.

Therefore the improved arrangement has entailed an extra cost of Rupees 19,834, or a little more than the total excess shown to be chargeable to works on the whole division.

The great increase in the cost of masonry was balanced by the saving effected in the construction of earthwork.

In the accounts the cost of bridges built at locks has been included with the locks at which they were built, the whole forming actually one structure.

The excess shown at Locks 7 and 14 is attributable to this arrangement, and is partly covered by the savings shown on Items A. and B., near the end of the comparative statement.

The most remarkable increase is at Lock No. 4. The original estimate for this allowed 1,536 cubic yards at a rate of Rupees 2-8-0 per yard, but the foundation of this lock was an exceedingly bad one, rendering much extra work absolutely necessary, and in fact there are 3,813 cubic yards of rubble masonry in the lock without counting arch work and cut-stone.

With the above explanations I trust the accounts will be passed by the Consulting Engineer in accordance with Government Order No. 18 of 5th January 1869.

No. 126. ORDER THEREON, 9th January 1873, No. 65.

IRRIGATION, No. 14.

UNDER the explanations furnished the excess of Rupees 41,950-12-11 over the sanctioned estimates for the 8th section of the Company's Canal is passed.

(True Extract.)

(Signed) G. W. WALKER, Colonel, R.E.,

Secretary to Government.

the Chief Engineer for Irrigation.

Acting Manager of the Madras Irrigation and Canal Company.

Lt-Col. Ir: H.C.O. Corps

. T. Austin.

Rec 5th January 1873 Ex 35-26

P. W. 1872 Depart.

No. 61. / No. 6014.

From
The Chief Engr. for Irrn

To
The Secy to Govt.
P. W. D.

Dated. 3rd Dec. 72.

Recd. 5th ——

Encls. 6

No. 65 - 9th Jany / 73.

Forwards letter No. 220 from the Ag. Manager. enclosing 3 Reports from the Ag. Chief Engr. explanatory of the excess expenditure on the 1st 2nd & 8th Sections of the Canal together with a Statement of the Net excess amount on the 8th Section requiring Sanction

With an order

Under the explanations furnished the excess of Rs. 1,950. 12. 11 over the sanctioned estimate - must be sanctioned for the 8th section of the Cawnpore Canal

W. Muir
Secy to Govt.

To the Chief Engr for Irrigation
Ag. Manager for Irrn
Ag. Chief Engr

6th Dec 72

Regd 11/1/73

Ckt 014

Govt. of {1872} Madras.

PUBLIC WORKS.

To The Chief Engineer for Irrigation

Dated

Rcd. Encl.

G. O. 9 "January 1872. No. 65-

Nos. 125 & 126

Re. Kistna Canal.

Expts of Rs: 21950-12-11 incurred over the Sanctioned Estimates for the "Section" of the Company's Canal, Sanctioned.